OBJECTIVES

1. As a result of this presentation, participants will be able to learn about different causes of cognitive changes.
2. As a result of this presentation, participants will be able to learn about how to prevent delirium.
3. As a result of this presentation, participants will be able to learn how to manage delirium with and without medications.
CONFUSION

- Delirium
- Dementia
- Depression
- Psychosis
## Delirium

- Diagnosis of Delirium
- Risk/predisposing factors
- Evaluation
- Difference between Delirium and Dementia
- Prevention
- Management

**Delirium**

* be crazy, rare, derangement
Delirium is also known as....

- Acute confusional state
- Acute mental status change
- Altered mental status (AMS)
- Toxic or metabolic encephalopathy
- Subacute befuddlement

**Table 1: DSM-5 criteria for Delirium**

A. A disturbance in attention (i.e., reduced ability to direct, focus, sustain, and shift attention) and awareness (reduced orientation to the environment).

B. The disturbance develops over a short period of time (usually hours to a few days), represents a change from baseline attention and awareness, and tends to fluctuate in severity over the course of a day.

C. An additional disturbance in cognition (e.g., memory deficit, disorientation, language, attention, or perception).

D. The disturbances in Criteria A and C are not better explained by a pre-existing, established or evolving neurocognitive disorder and do not occur in the context of a severely reduced level of arousal, such as coma.

E. There is evidence from the history, physical examination or laboratory findings that the disturbance is a direct physiological consequence of another medical condition, substance intoxication or withdrawal, or exposure to a toxin, or is due to multiple etiologies.

**WHAT IS DELIRIUM? DSM-5**

- Delirium - disorder of **attention and awareness** that develops acutely and tends to fluctuate.
Criteria to Diagnose Delirium

General medical condition, an intoxicating substance, medication use, or more than one cause.

DSM 5 - Delirium

1. Disturbance in attention (ie, reduced ability to direct, focus, sustain, and shift attention) and orientation to the environment.

2. Disturbance develops over a short period of time (usually hours to a few days)

DSM 5 – Delirium (con.)

3. Change in an additional cognitive domain, such as memory deficit, disorientation, or language disturbance, or perceptual disturbance that is not better accounted for by a preexisting, established conditions.

4. Disturbances in No. 1 and 3 must not occur in the context of a severely reduced level of arousal, such as coma.
There is evidence of **substantial** cognitive decline from a previous level of performance in one or more of the domains.

The cognitive deficits are **sufficient** to interfere with **independence**.

Delirium is a treatable and reversible condition that must be diagnosed and treated early.

Delirium is not a normal part of aging and should not be confused with dementia.
Neuropathophysiology

Inflammation

- C-reactive protein
- Interleukin-6
- TNFα
Delirium is common and commonly missed.

Neurotransmitters

- Glutamatergic
- Dopaminergic
- Cholinergic

Types

- 15% Hyperactive
- 25% Hypoactive/Hyper somnolent
- 60% Mix
5 every min.
2.6 million/year

- Hypoactive: move slowly/not active + sleepy + withdrawn + decline in communication
  - Can affect anyone, but most common type in elderly patients
  - Easy to miss
  - ~25% of cases
- Hyperactive: worried/afraid + restless + repetitive movements + hallucinations + delusions
  - Easier to recognize
  - ~15% of cases
- Mixed: aspects of both hypo and hyperactive
  - ~60% of cases

Delirium Statistics

- 6% to 12% LTC
- 15% to 55% hospital
- 25% to 60% post hospitalization

Culp et al, J of Neuroscience Nursing
POSTOPERATIVE DELIRIUM INCIDENCE

- Noncardiac surgery: 25%
- Cardiac surgery: 50%
- Hip fracture repair: 50%

SO WHAT?
Complications of Delirium

- Increased morbidity and mortality
- Functional decline
- Increased health care costs

Cumulative Hazard of Death Associated with Delirium and the Number of Adverse Hospital Exposures (AHE)

RISK/PREDISPOISING FACTORS

Center for Outcomes Research and Evaluation, Yale-New Haven Hospital, New Haven, Connecticut

- Wernicke's disease or ethanol withdrawal
- Hypoxia or hypercarbia
- Hypoglycemia
- Hypertensive encephalopathy
- Hyperthermia or hypothermia
- Intracerebral hemorrhage
- Meningitis/encephalitis
- Poisoning (whether exogenous or iatrogenic)
- Status epilepticus
DELIRIUM

- Drugs and Dementia
- Electrolyte
- Lack of drugs
- Infection
- Reduced sensory input
- Intracranial
- Urinary retention
- Myocardial

Predictors of Delirium - NH

- Inadequate fluid intake
- Dementia
- Sensory impairment
- Falling in past 30 days
- Medications

Research in Nursing & Health, 1999;22,95-105

Predictors of Delirium – In Pt.

- Physical restraints
- >3 New medications
- Foley catheter
- Infection
- Dehydration

POST OP. DELIRIUM

Center for Outcomes Research and Evaluation, Yale-New Haven Hospital, New Haven, Connecticut

INCIDENCE & RISKS FOR POSTOPERATIVE DELIRIUM

Increased risk with preoperative risk factors:

- Advanced age
- Cognitive impairment
- Physical functional impairment
- History of alcohol abuse
- Abnormal serum chemistries
- Intrathoracic and aortic aneurysm surgery

<table>
<thead>
<tr>
<th>1 or 2 risk factors</th>
<th>3+ risk factors</th>
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### INCIDENCE & RISKS FOR POSTOPERATIVE DELIRIUM

- **1 or 2 risk factors:**
  - 10%
- **3+ risk factors:**
  - 50%

### DELIRIUM

- Drugs and Dementia
- Electrolyte
- Lack of drugs
- Infection
- Reduced sensory input
- Intracranial
- Urinary retention
- Myocardial
Medications that may induce/contribute: ACUTE CHANGE IN MS

- A – Antiparkinsonian
- C – Corticosteroids
- U – Urologic (antispasmodics)
- E – Emetic (antiemetics)
- T – Theophylline
- C – Cardiac (antiarrhythmics)
- H – H2 blockers
- A – Anticholinergics
- N – NSAIDs
- G – Geropsychotropics
- E – Etoh
- I – Insomnia meds
- N – Narcotics
- M – Muscle relaxants
- S – Seizure meds
Delirium - Risk factors - Drugs

- **Anticholinergics**
  - First Generation Antihistaminic (FGA)
  - Benzodiazepines or alcohol
  - GI – H2 blockers and PPI
  - Opioid analgesics

- **Popular OTC with anticholinergic properties**
  - Brompheniramine (Dimetapp)
  - Chlorpheniramine (Chlor-Trimeton, Chlor-Tab, Aller-Chlor)
  - Clemastine (Dayhist)
  - Dimenhydrinate (Dramamine, Driminate)
  - Diphenhydramine (Benadryl, Sominex, Dipizalbid, Wal-Dryl, Hydramine, Tylenol PM, Advil PM, Aleve PM)

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**QUESTION (1 of 2)**

Which one of the following classes of medication is the most common cause of delirium in hospitalized older adults?

- A. Angiotensin-receptor blockers
- B. H2-receptor antagonists
- C. Selective serotonin-reuptake inhibitors
- D. H1-receptor antagonists
- E. HMG-CoA reductase inhibitors
### QUESTION (2 of 2)

Which one of the following classes of medication is the most common cause of delirium in hospitalized older adults?

A. Angiotensin-receptor blockers  
B. H2-receptor antagonists  
C. Selective serotonin-reuptake inhibitors  
D. H1-receptor antagonists  
E. HMG-CoA reductase inhibitors

### EVALUATION

Criteria to Diagnose Delirium

There is evidence from the history, physical examination, or laboratory findings that the disturbance is caused by a direct consequence of a general medical condition, an intoxicating substance, **medication use**, or more than one cause.
Evaluation of Delirium

- History
- Physical
- Mental status
- Laboratory

Delirium is accessible in patients who are arousable to verbal stimulation

Diagnosing delirium

- 4AT
- CAM – Confusion Assessment Method
- B-CAM
- CAM-ICU
- Test for attention
Acute onset and fluctuating course
Is there evidence of an acute change in mental status from the patient’s baseline?
☐ Yes ☐ No

Did this behavior tend to come and go or increase and decrease in severity?
☐ Yes ☐ No

CAM – Confusion Assessment Method

Inattention
Does the patient have difficulty focusing attention or have difficulty keeping track of what has been said?
☐ Yes ☐ No

Disorganized thinking
Is the patient’s speech disorganized or incoherent?
☐ Yes ☐ No

The diagnosis of delirium by CAM requires the presence of features 1 and 2 and either 3 or 4

Confusion Assessment Method

B CAM – BRIEF

CONFUSION ASSESSMENT METHOD
Tests of Attention

- Serial 7’s from 100
- Serial 3’s from 40 or 20
- “WORLD” backwards
- Months of the year, backwards
- Digit span memory test

Case-diagnosis

Case #1

Which of the following is most likely to help establish the diagnosis?

- A. Orientation to person, place and time
- B. Orientation to person, place, and time and ability to draw a clock
- C. Ability to recite the months of the year or days of the week forward
- D. Score on geriatric depression scale
- E. Score on visual analog pain scale
Case (con.)

Which of the following is most likely to help establish the diagnosis?

- A. Orientation to person, place and time
- B. Orientation to person, place, and time and ability to draw a clock
- **C. Ability to recite the months of the year or days of the week forward**
- D. Score on geriatric depression scale
- E. Score on visual analog pain scale

Case #2

Which of the following is most helpful in establishing the diagnosis of delirium?

- Order neurosurgery consult
- Determine why the patient stopped working and driving
- Perform the digit-span memory test
- Order CT/MRI of the brain

Case #2

Which of the following is most helpful in establishing the diagnosis of delirium?

- Order neurosurgery consult
- Determine why the patient stopped working and driving
  - **Perform the digit-span memory test**
- Order CT of the brain
DSM 5 – Dementia/major neurocognitive disorder

There is evidence of **substantial** cognitive decline from a previous level of performance in one or more of the domains.

The cognitive deficits are **sufficient** to interfere with **independence**

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**Dementia and Delirium**

- **Dementia** - 40% delirious
- **Delirious** - 40% dementia
<table>
<thead>
<tr>
<th>Delirium/Dementia</th>
<th></th>
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</thead>
<tbody>
<tr>
<td>LOC-fluctuate</td>
<td>LOC-alert</td>
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<tr>
<td>Acute</td>
<td>Chronic</td>
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<tr>
<td><strong>Inattention</strong></td>
<td><strong>Attention</strong></td>
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<tr>
<td>drowsiness,</td>
<td>irreversible-usually</td>
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<tr>
<td>distractibility</td>
<td></td>
</tr>
<tr>
<td>Reversible</td>
<td></td>
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</tbody>
</table>

**PREVENTION OF DELIRIUM**

**I can prevent DELIRIUM**
Environmental Manipulation

- Day time stimulation
- Quiet time at night
- Clock, calendar
- Familiar items

Prevention of Delirium

- Sleep
- Immobility
- Visual/Hearing
- Dehydration

Inouye SK, et al. NEJM 1999; 340(9):669-76

DELIRIUM CAN BE PREVENTED IN >30%

https://jamanetwork.com/journals/jama/article-abstract/2673130
ABCDEF bundle

- **ABC** Assess, Prevent, and Manage Pain, Both Spontaneous Awakening Trials (SAT) and Spontaneous Breathing Trials (SBT) Choice of analgesia and sedation
- **Delirium:** Assess, Prevent, and Manage
- Early mobility and Exercise
- Family engagement and empowerment

MANAGEMENT

PHARMACOLOGICAL MANAGEMENT – WHAT REALLY WORKS??
Pharmacological

- Haloperidol
- Quetiapine
- Cholinesterase inhibitors – DON'T
- Rx Alcohol/Benzodiazepine withdrawal

Haloperidol

- May reduce duration and severity
- Prolongs QTc
- 0.5-1mg PO/IM (twice as potent)
- Maintain effective dose for 2-3 days
- Slowly taper and D/C
- Switch to 2nd generation if use > 1wk

Quetiapine

- LBD, AIDS-related dementia or EPS
- 12.5-25 mg q 12hrs
- Max 100mg/d - ? Antihistaminic property
- ½ needed dose for 2-3 days than taper/D/C
Cholinesterase inhibitors
- Contraindicated for adjunctive Tx in ICU
- May increase mortality

Alcohol withdrawal
- Lorazepam 0.5-2 mg IV/po q 1-2 hrs.
- Gradual withdrawal and D/C
- Thiamine 100mg/day

Case-HELP

INTERPROFESSIONAL INPATIENT GERIATRIC CONSULTATION TEAM (IP GC TEAM)
Prevention

Which of the following is most likely to result from use of an **interprofessional inpatient geriatric consultation team (IP GC Team)** to care for patients admitted for hip fracture?

A. Reduced number of delirium episodes  
B. Reduced severity of incident delirium  
C. Reduced duration of incident delirium  
D. Increased cognitive decline during hospitalization

**Delirium is a treatable and reversible condition that must be diagnosed and treated early.**
Summary (1/2)

- Delirium is common and associated with substantial morbidity for older people.
- Delirium can be diagnosed with high sensitivity and specificity using the CAM.
- A thorough history, physical, and focused labs should be performed to identify the underlying cause(s) of delirium.

Summary (2/2)

- A careful medication review is mandatory; discontinue any agent likely to contribute to delirium, if possible.
- Managing delirium involves treating the underlying cause(s), avoiding complications, managing behavioral problems, providing rehabilitation.
- The best treatment for delirium is prevention.

Delirium

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